McClure Middle School Lesson Plans:

Teacher: Poole **Topic:** Transformations - Translations **Day:** 1 **Date:** October

Unit:	**Grade/Subject:**
Standard/Element: **MGSE8.G.1** Verify experimentally the properties of rotations, reflections, and translations: Lines are taken to lines and line segments to line segments of the same length; angles are taken to angles of the same measure; parallel lines are taken to parallel lines. **MGSE8.G.2** Understand that two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. **MGSE8.G.3** Describe the effect of dilations, translations, rotations, and reflections on 2-dimensional figures using coordinates.	**EQ:** What is a transformation? What is a translation? How can the coordinate plane help me understand properties of translations? What happens to the size and shape of a figure when it is translated?

Opening

Launch/Anchor Concepts:

Describe what you know about the following words:
Rotation, reflection, translation, dilation, two-dimensional, congruent, sequence, coordinates, x & y axes, horizontal, vertical

Put the standard on board and read over what the expectation of the standard states.

Work Period

Practice /task/activity:

Students will explore the transformation of Translation by completing a self-discovery task in groups. After reading the beginning paragraph, have students work 1A. Then complete the item with the students. Have students do item B and then complete with the students. Have students complete item C and then complete with the students. Discuss Question 2A.

Students will continue to work through the task completing #3A-L.

Questions I want to make sure I ask:

- How did you know to move up, down, left or right? (DOK 2)
- How would you explain your move as a rule? (DOK 2)
- Which one is the pre-image and how can you determine that on the graph? (DOK2)

Closing:

Describe how you will facilitate the closing.

Go over the important aspects of the task by randomly selecting students from each group to answer questions: 2A, 3B, 3D, 3F, 3G, 3H, 3I, 3K. The answers to these question reiterate the point that the transformation of Translation does NOT affect the size or shape of the geometric figure.

Data Discussion/Assessment:

Informal: Observation
Formative:
Summative:
Data Discussion:

Differentiation:

- Flexible Grouping: Students are paired heterogeneously determined by data from last unit test. Students who have had a stronger grasp of concepts will be able to reinforce their understanding by having conversations with students who have a similar understanding of the unit. The grouping also allows for Teacher to ask leading questions that remediate and enrich based on student needs.

McClure Middle School Lesson Plans:

Teacher: Poole **Topic:** Transformations - Translations **Day:** 2

Unit:	**Grade/Subject:** 8th Math
Standard/Element: **MGSE8.G.1** Verify experimentally the properties of rotations, reflections, and translations: Lines are taken to lines and line segments to line segments of the same length; angles are taken to angles of the same measure; parallel lines are taken to parallel lines. **MGSE8.G.2** Understand that two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. **MGSE8.G.3** Describe the effect of dilations, translations, rotations, and reflections on 2-dimensional figures using coordinates.	**EQ:** How can I describe a translation? How can the coordinate plane help me understand properties of translations?

Opening

Launch/Anchor Concepts:

Answer the following questions using yesterday's Translation Task:

1. What is a transformation?
2. What are vertices?
3. When does it mean when geometric figures are congruent?
4. Which ways would you move on the coordinate graph if you moved vertically?
5. Which ways would you move on the coordinate graph if you moved horizontally?
6. What is a pre-image?
7. How can you tell the difference between the original shape and the transformed shape?

Work Period

Practice /task/activity:

Direct instruction using power point instructions regarding how to describe & write a translation using the different descriptions for translation notation.

Translation: 1 unit left and 5 units up
Translation: horizontally -1 units and vertically 5 units
Translation: $(x,y) \rightarrow (x - 1, y + 5)$
Translation: (-1, 5)

Students will complete a task that translates a shape several times around the coordinate grid. Then the task will require the students to translate shape on a coordinate grid using the notation.

Questions I want to make sure I ask:

- How did you know to move up, down, left or right? (DOK 2)

- How would you explain your move as a rule? (DOK 2)
- How do you remember which one is the original figure and which one is the new image? (DOK1)
- How would a horizontal move be indicated using the rule? (DOK1)
- How would a vertical move be indicated using the rule? (DOK1)
- What happens to the shape when it is translated? (DOK2)

Closing:

Describe how you will facilitate the closing.

Selected students will explain what the important parts of selected problems. Each time pointing out that the shape remains congruent.

Data Discussion/Assessment:

Informal: Observation
Formative:
Summative:
Data Discussion:

Differentiation:

- Flexible Grouping: Students are paired heterogeneously determined by data from last unit test. Students who have had a stronger grasp of concepts will be able to reinforce their understanding by having conversations with students who have a similar understanding of the unit. The grouping also allows for Teacher to ask leading questions that remediate and enrich based on student needs.

Day 3:

Day 4: Using only coordinates – find the new image coordinates after a translation is performed & determine what translation happened when given the set of points from a preimage and a new image.

McClure Middle School Lesson Plans:

Teacher: POOLE **Topic:** Transformations -Reflections **Day:** 5 **Date:** 10/03/16

Unit:	**Grade/Subject:**
Standard/Element: **MGSE8.G.1** Verify experimentally the properties of rotations, reflections, and translations: Lines are taken to lines and line segments to line segments of the same length; angles are taken to angles of the same measure; parallel lines are taken to parallel lines. **MGSE8.G.2** Understand that two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. **MGSE8.G.3** Describe the effect of dilations, translations, rotations, and reflections on 2-dimensional figures using coordinates.	**EQ:** What is a reflection? How can the coordinate plane help me understand properties of reflections? What happens to the size and shape of a figure when it is reflected?

Opening

Launch/Anchor Concepts:

Provide a description of each of the following translations, where *c* can represent any number.

1) (x + c, y): The figure moves to the right "c" units, but does not move vertically.
2) (x, y – c)
3) (x – c, y)
4) (x, y + c)
5) (x + c, y – c)

Work Period

Practice /task/activity:

Transformations Task II – Reflections:
Students will explore the transformation of Reflection by completing a self-discovery task in groups. Go over the activity with students. Begin by completing #1-3 together as a class. Go over the questions by randomly choosing students to answer the questions. Students will then have 7 minutes to complete #4a-d. The class will reconvene and go over the answers to B & D by randomly choosing students to answer the questions. Students will be allowed 7 minutes to complete #5a-d. Again the class will reconvene to discuss B & D by randomly choosing students to answer the questions. Students will be given 7 minutes to complete #6a-c. In order to complete the task, students will be given 5-7 minutes answer #7-9. The students will reconvene one last time to compile their thoughts about what a reflection does and does not do to a figure on a coordinate graph.

Questions I want to make sure I ask:

- How do you know when you should reflect it horizontally? (DOK2)
- How do you know when you should reflect it vertically? (DOK2)
- How do you know where to graph each point of the new image? (DOK2)
- What changes with the coordinate as you reflect the vertices of each figure? (DOK2)
- Does the coordinate change differently when you have a different line of reflection? (DOK2)
- How far are the pre-image coordinates compared to the image coordinates from the reflection line? (DOK2)

Closing:

Describe how you will facilitate the closing.

TOTD: Students will take out a sheet of paper and answer the following questions:

1. What changes about the coordinate of a figure when the pre-image when the line of reflection is the x-axis?
2. What changes about the coordinate of a figure when the pre-image when the line of reflection is the y-axis?

Data Discussion/Assessment:

Informal: Observation & Discussion
Formative:
Summative:
Data Discussion:

Differentiation:

- Flexible Grouping: Students are paired heterogeneously determined by data from last unit test. Students who have had a stronger grasp of concepts will be able to reinforce their understanding by having conversations with students who have a similar understanding of the unit. The grouping also allows for Teacher to ask leading questions that remediate and enrich based on student needs.

McClure Middle School Lesson Plans:

Teacher: Poole **Topic:** Transformations –Reflections **Day:** 6 **Date:** 10/04/16

Unit:	**Grade/Subject:**
Standard/Element: **MGSE8.G.1** Verify experimentally the properties of rotations, reflections, and translations: Lines are taken to lines and line segments to line segments of the same length; angles are taken to angles of the same measure; parallel lines are taken to parallel lines. **MGSE8.G.2** Understand that two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. **MGSE8.G.3** Describe the effect of dilations, translations, rotations, and reflections on 2-dimensional figures using coordinates.	**EQ:** What is a reflection? How can the coordinate plane help me understand properties of reflections? What happens to the size and shape of a figure when it is reflected? How can you describe a reflection using a rule?

Opening

Launch/Anchor Concepts:

Answer the following questions using yesterday's Reflection Task:

1. What is a reflection?
2. What is a reflection line?
3. How far are the corresponding coordinates from the reflection line?
4. What changes about the coordinates if the image is reflected over the x-axis?
5. What changes about the coordinates if the image is reflected over the y-axis?
6. Does the reflection of any image change the size or shape?
7. How could you prove that two images are congruent?

Work Period

Practice /task/activity:

Direct instruction using power point instructions regarding how to use the rule to describe a reflection. Students will use the "Reflections Notes" page (copied & given to them) to show the skill of reflecting a figure on a coordinate graph. Remind the students to make an "INDICATOR MARK" to remind them which line they are reflecting over to minimize the probability of reflecting over the wrong reflection line.

Students will complete several translations and reflections on coordinate grids. The task will require them to both draw and to list the new coordinates.

Questions I want to make sure I ask:

- What is a reflection? (DOK1)
- What is a reflection line? (DOK1)

- How far are the corresponding coordinates from the reflection line? (DOK2)
- What changes about the coordinates if the image is reflected over the x-axis? (DOK2)
- What changes about the coordinates if the image is reflected over the y-axis? (DOK2)
- Does the reflection of any image change the size or shape? (DOK1)
- How could you prove that two images are congruent? (DOK3)
- What is the difference between a translation and a reflection? (DOK2)
- What is the same about a translation and a reflection? (DOK2)

Closing:

Describe how you will facilitate the closing.

Students will be randomly chosen to show and describe how they reflected on their work period.

Data Discussion/Assessment:

Informal: Observation & Discussion
Formative:
Summative:
Data Discussion:

Differentiation:

- Flexible Grouping: Students are paired heterogeneously determined by data from last unit test. Students who have had a stronger grasp of concepts will be able to reinforce their understanding by having conversations with students who have a similar understanding of the unit. The grouping also allows for Teacher to ask leading questions that remediate and enrich based on student needs.

Day 7: Quiz on Translations & Reflections 10/5/16

McClure Middle School Lesson Plans:

Teacher: Poole **Topic:** Transformations –Rotations **Day:** 8 **Date:** 10/06/2016

Unit:	**Grade/Subject:**
Standard/Element: **MGSE8.G.1** Verify experimentally the properties of rotations, reflections, and translations: Lines are taken to lines and line segments to line segments of the same length; angles are taken to angles of the same measure; parallel lines are taken to parallel lines. **MGSE8.G.2** Understand that two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. **MGSE8.G.3** Describe the effect of dilations, translations, rotations, and reflections on 2-dimensional figures using coordinates.	**EQ:** What is a rotation? How can the coordinate plane help me understand properties of rotations? What happens to the size and shape of a figure when it is rotated?

Opening

Launch/Anchor Concepts:

Consider the following coordinates of a quadrilateral: A(0,1), B (1,2), C(3,2), D(5,1). What would the points for a new image be if the following transformations were performed?

1. Translation: (x ,y) → (x +3 , y-5)
2. Reflected over the x-axis.

Work Period

Practice /task/activity:

Transformations Task #3A – Clockwise Rotations

Students will be utilizing a graph with a transparency on top to complete a task to help them discover the rules for clockwise rotations. The lab has the students draw a pre-image and then rotate the image in increments of 90°, 180°, 270° and 360°. The student then compares the coordinates to notice a pattern when the coordinates are changed depending on the angle of rotation.

Questions I want to make sure I ask:

- How far is a 90° rotation? (DOK1)
- What do you notice about the values of the coordinates in a 90° rotation? (DOK2)
- How far is a 180° rotation? (DOK1)
- What do you notice about the values of the coordinates in a 180° rotation? (DOK2)
- What is a 270° rotation? (DOK1)

- What could a 270° rotation also be considered? (DOK2)
- What does clockwise mean? (DOK1)

Closing:

Describe how you will facilitate the closing.

Students will be asked to share their discoveries about the rules of rotation depending on the degree of rotation in order to summarize what happens to the coordinates once the rotation is completed.

Data Discussion/Assessment:

Informal: Observation and discussion
Formative:
Summative:
Data Discussion:

Differentiation:

- Flexible Grouping: Students are paired heterogeneously determined by data from 10/5 quiz. Students who have had a stronger grasp of concepts will be able to reinforce their understanding by having conversations with students who have a similar understanding of the unit. The grouping also allows for Teacher to ask leading questions that remediate and enrich based on student needs.

McClure Middle School Lesson Plans:

Teacher: Poole **Topic:** Transformations -Rotations **Day:** 9 **Date:** 10/07/2015

Unit:	**Grade/Subject:**
Standard/Element: **MGSE8.G.1** Verify experimentally the properties of rotations, reflections, and translations: Lines are taken to lines and line segments to line segments of the same length; angles are taken to angles of the same measure; parallel lines are taken to parallel lines. **MGSE8.G.2** Understand that two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. **MGSE8.G.3** Describe the effect of dilations, translations, rotations, and reflections on 2-dimensional figures using coordinates.	**EQ:** What is a rotation? How can the coordinate plane help me understand properties of rotations? What happens to the size and shape of a figure when it is rotated?

Opening

Launch/Anchor Concepts:

Consider the following coordinates of a quadrilateral: A(0,1), B (1,2), C(3,2), D(5,1). What would the points for a new image be if it were rotated 90° clockwise?

Work Period

Practice /task/activity:

Transformations Task #3B –Counterclockwise Rotations

Students will be utilizing a graph with a transparency on top to complete a task to help them discover the rules for counterclockwise rotations. The lab has the students draw a pre-image and then rotate the image in increments of 90°, 180°, 270° and 360°. The student then compares the coordinates to notice a pattern when the coordinates are changed depending on the angle of rotation.

Questions I want to make sure I ask:

- How far is a 90° rotation? (DOK1)
- What do you notice about the values of the coordinates in a 90° rotation? (DOK2)
- How far is a 180° rotation? (DOK1)
- What do you notice about the values of the coordinates in a 180° rotation? (DOK2)
- What is a 270° rotation? (DOK1)
- What could a 270° rotation also be considered? (DOK2)
- What does clockwise mean? (DOK1)
- What does counterclockwise mean? (DOK1)

Closing:

Describe how you will facilitate the closing.

Students will be asked to share their discoveries about the rules of rotation depending on the degree of rotation in order to summarize what happens to the coordinates once the rotation is completed.

Data Discussion/Assessment:

Informal: Observation and discussion – assignment on 10/9 collected
Formative: Quiz on Transformations 10/16
Summative: Unit Summative planned for 10/22 or 23
Data Discussion: Will occur after quiz on 10/16

Differentiation:

- Flexible Grouping: Students are paired heterogeneously determined by 10/5 quiz data. Students who have had a stronger grasp of concepts will be able to reinforce their understanding by having conversations with students who have a similar understanding of the unit. The grouping also allows for Teacher to ask leading questions that remediate and enrich based on student needs.

McClure Middle School Lesson Plans:

Teacher: Poole **Topic:** Transformations - Rotations **Day:** 10 **Date:** 10/10/2016

Unit:	**Grade/Subject:**
Standard/Element: **MGSE8.G.1** Verify experimentally the properties of rotations, reflections, and translations: Lines are taken to lines and line segments to line segments of the same length; angles are taken to angles of the same measure; parallel lines are taken to parallel lines. **MGSE8.G.2** Understand that two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. **MGSE8.G.3** Describe the effect of dilations, translations, rotations, and reflections on 2-dimensional figures using coordinates.	**EQ:** What is a rotation? How can the coordinate plane help me understand properties of rotations? What happens to the size and shape of a figure when it is rotation?

Opening

Launch/Anchor Concepts:

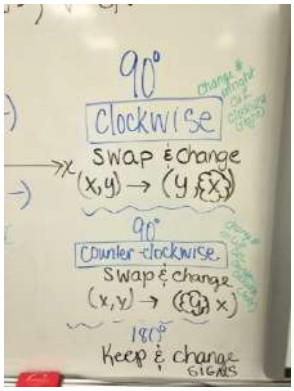
Thinking about the last two days' of the Rotations Labs, answer the following questions.

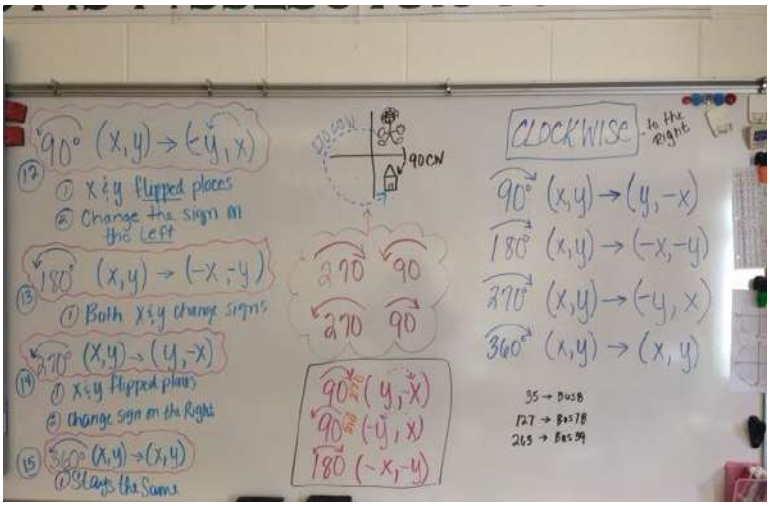
1. What happens to the coordinates of a pre-image when it is rotated 90°?
2. What happens to the coordinates of a pre-image when it is rotated 180°?
3. What happens to the coordinates of a pre-image when it is rotated 270°?
4. What does clockwise mean?
5. What does counterclockwise mean?

Work Period

Practice /task/activity:

Summarize the rules for Rotating Figures on a coordinate graph: Clockwise: 90°→ (y, -x); 180 → (-x, -y); 270°→ (-y ,x). For Counterclockwise: 90°→ (-y, x); 180°→ (-x, -y); 270°→ (y, -x). To make the rules a little more friendly…refer to board notes





Direct instruction using power point instructions regarding how to use the rule to describe a rotation. Summarize what students were to know from the Rotations Lab and demonstrate how they are to use the rules to rotate figures on today's work period.

Students will practice rotating figures on a coordinate graph by completing 8 problems that require them to write the rule from an already rotated pre-image and to perform the rotation when given a pre-image and a directive of the different degrees of rotation. They are also given a description of a figure using only the coordinates and they are required to draw the pre-image on a coordinate graph and follow the rotation directive given to also draw the image of the pre-image.

Differentiated Instruction:

- *Students will be given a copy of the rules to use after they have attempted to write their own copy.*
- *The problems presented on the work period are structured to be less rigor on the beginning and more challenging on the later problems so students can have the level of rigor for their level of understanding, but have the opportunity to work problems at as high of level as they can.*

Questions I want to make sure I ask:

- How do you know when to turn to the right? (DOK1)
- How do you know when you should rotate to the left? (DOK1)
- When looking at the coordinates, when should you reverse the values of x and y? (DOK2)
- When looking at the coordinates, when should you keep the values of x and y in the same order? (DOK2)
- When should you change the signs of the y-coordinate? (DOK2)
- When should you change the signs of the x-coordinate? (DOK2)
- Instead of rotating 270° clockwise, what could you do instead? (DOK2)
- Instead of rotating 270° counterclockwise, what could you do instead? (DOK2)
- What happens to the size and shape of a figure when it is rotated? (DOK2)

Closing:

Describe how you will facilitate the closing.

Students will be chosen to demonstrate and explain how they found the new image and coordinates using the rules for rotations.

Data Discussion/Assessment:

Informal: Observation and discussion
Formative: Quiz on Rigid Transformations 10/11
Summative: Unit Summative planned for 10/25
Data Discussion: Will occur after quiz on 10/11

Differentiation:

- Flexible Grouping: Students are paired heterogeneously determined by 10/5 quiz data. Students who have had a stronger grasp of concepts will be able to reinforce their understanding by having

conversations with students who have a similar understanding of the unit. The grouping also allows for Teacher to ask leading questions that remediate and enrich based on student needs.

McClure Middle School Lesson Plans:

Teacher: Poole **Topic:** Transformations - all **Day:** 11 **Date:** 10/11/2016

Unit:	**Grade/Subject:**
Standard/Element: **MGSE8.G.1** Verify experimentally the properties of rotations, reflections, and translations: Lines are taken to lines and line segments to line segments of the same length; angles are taken to angles of the same measure; parallel lines are taken to parallel lines. **MGSE8.G.2** Understand that two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. **MGSE8.G.3** Describe the effect of dilations, translations, rotations, and reflections on 2-dimensional figures using coordinates.	**EQ:** What is a transformation? How can the coordinate plane help me understand properties of transformations? What happens to the size and shape of a figure when it "changed" by a rigid transformation?

Opening

Launch/Anchor Concepts:

Consider the following coordinates of a quadrilateral: A (0, 1), B (1, 2), C (3, 2), D (5, 1). What would the points for a new image be if the following transformations were performed?

1. 90° rotation clockwise
2. Reflection over the x-axis
3. Translation of 2 units right and 3 units down
4. 180° rotation counter-clockwise
5. 270° rotation clockwise
6. 90° rotation counter-clockwise

Work Period

Practice /task/activity:

Students will take a quiz over all 3 types of rigid transformations: Translations, Reflections, and Rotations.

Differentiated Instruction:

- *Students will be permitted to use their copies of the coordinate rules.*
- *Students will have "hint bubbles" on quiz to help them answer the questions.*

Questions I want to make sure I ask:

- How do you know when to turn to the right? (DOK1)
- How do you know when you should rotate to the left? (DOK1)
- When looking at the coordinates, when should you reverse the values of x and y? (DOK2)

- When looking at the coordinates, when should you keep the values of x and y in the same order? (DOK2)
- When should you change the signs of the y-coordinate? (DOK2)
- When should you change the signs of the x-coordinate? (DOK2)
- Instead of rotating 270° clockwise, what could you do instead? (DOK2)
- Instead of rotating 270° counterclockwise, what could you do instead? (DOK2)
- What happens to the size and shape of a figure when it is rotated? (DOK2)
- What is a reflection? (DOK1)
- What is a reflection line? (DOK1)
- How far are the corresponding coordinates from the reflection line? (DOK2)
- What changes about the coordinates if the image is reflected over the x-axis? (DOK2)
- What changes about the coordinates if the image is reflected over the y-axis? (DOK2)
- Does the reflection of any image change the size or shape? (DOK1)
- How could you prove that two images are congruent? (DOK3)
- What is the difference between a translation and a reflection? (DOK2)
- What is the same about a translation and a reflection? (DOK2)
- How did you know to move up, down, left or right? (DOK 2)
- How would you explain your move as a rule? (DOK 2)
- Which one is the pre-image and how can you determine that on the graph? (DOK2)

Closing:

Describe how you will facilitate the closing.

Discussion: review the above questions by randomly choosing students to answer.

Data Discussion/Assessment:

Informal: Observation and discussion
Formative: Quiz on Rigid Transformations 10/11
Summative: Unit Summative planned for 10/25
Data Discussion: Will occur after quiz on 10/11

Differentiation:

- Students will be permitted to use their copies of the coordinate rules.
- Students will have “hint bubbles” on quiz to help them answer the questions.

McClure Middle School Lesson Plans:

Teacher: Poole **Topic:** Transformations - Dilations **Day:** 12 **Date:** 10/12/2016

Unit: Transformations – Dilations	**Grade/Subject:** 8th Math
Standard/Element: **MGSE8.G.1** Verify experimentally the properties of rotations, reflections, and translations: Lines are taken to lines and line segments to line segments of the same length; angles are taken to angles of the same measure; parallel lines are taken to parallel lines. **MGSE8.G.2** Understand that two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. **MGSE8.G.3** Describe the effect of dilations, translations, rotations, and reflections on 2-dimensional figures using coordinates.	**EQ:** What is a dilation? How is a dilation different from the other 3 transformations? How can you tell if a figure has been dilated?

Opening

Launch/Anchor Concepts:

1. What type of transformations would change (-6, 3) into (6, 3)?
2. When (-4, -5) is changed to (4, 5), what type of transformation occurred?
3. What type of transformation would change (-9, 3) into (3, 9)?
4. What kind of transformation would change (0, 3) into (0, -3)?
5. What type of transformation would place point (-9, 2) at (0, 0)?

Work Period

Practice /task/activity:

<u>*Dilations in the Coordinate Plane*</u> – Smiley Face Task from Frameworks.
Students will compare 6 graphs of a smiley face. Each person in the pair will graph 3 sets of ordered pairs. Once the graphs are completed, they will compare and answer questions related to the shapes and their size and their similarity.

Differentiated Instruction:

- *Students are grouped heterogeneously based on data from 10/11 quiz. This type of grouping will allow for students to have the level of conversation based on understanding of the previous transformations.*
- *Students will be given work period with "hint bubbles" to help lead them through the activity.*

Questions I want to make sure I ask:

- How are the coordinates comparing? (DOK2)
- What do you notice about the way they look? (DOK2)
- Is that figure "similar" to figure 1? (DOK2)
- What is different about the shape compared to figure 1? (DOK2)
- What do you think makes a true dilation? (DOK3)

- Are the figures truly dilated if they are only "stretched" in one direction? (DOK3)
- What if they were "stretched" in both directions, but by a different number? (DOK3)
- What if the shape is smaller than the original shape, is it a dilation? (DOK2)
- Describe how to determine if shapes are similar. (DOK2)

Closing:

Describe how you will facilitate the closing.

6 groups will transfer one of the graphs to a larger grid (just like the originals) so the class can have a discussion while looking and comparing the figures.

Discussion of the students' findings (get through as many questions from the activity as time allows) – teacher led to be sure to get the underlying information out about the importance of the task.

Data Discussion/Assessment:

Informal: Observation and discussion
Formative: Quiz on all Transformations 10/16
Summative: Unit Summative planned for 10/25
Data Discussion: Will occur after quiz on 10/16

Differentiation:

- Flexible Grouping: Students are paired heterogeneously determined by 10/11 quiz data. Students who have had a stronger grasp of concepts will be able to reinforce their understanding by having conversations with students who have a similar understanding of the unit. The grouping also allows for Teacher to ask leading questions that remediate and enrich based on student needs.
- Students will be given copies of the faces so they can get into the discussion in a timely manner.

McClure Middle School Lesson Plans:

Teacher: Poole **Topic:** Transformations - Dilations **Day:** 13 **Date:** 10/13/2016

Unit: Transformations – Dilations	**Grade/Subject:** 8th Math
Standard/Element: **MGSE8.G.1** Verify experimentally the properties of rotations, reflections, and translations: Lines are taken to lines and line segments to line segments of the same length; angles are taken to angles of the same measure; parallel lines are taken to parallel lines. **MGSE8.G.2** Understand that two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. **MGSE8.G.3** Describe the effect of dilations, translations, rotations, and reflections on 2-dimensional figures using coordinates.	**EQ:** What is a dilation? How is a dilation different from the other 3 transformations? How can you tell if a figure has been dilated?

Opening

Launch/Anchor Concepts:

6. What type of transformations would change (-6, 3) into (6, 3)?
7. When (-4, -5) is changed to (4, 5), what type of transformation occurred?
8. What type of transformation would change (-9, 3) into (3, 9)?
9. What kind of transformation would change (0, 3) into (0, -3)?
10. What type of transformation would place point (-9, 2) at (0, 0)?

Work Period

Practice /task/activity:

<u>*Dilations in the Coordinate Plane*</u> – Smiley Face Task from Frameworks.
Students will compare 6 graphs of a smiley face. Each person in the pair will graph 3 sets of ordered pairs. Once the graphs are completed, they will compare and answer questions related to the shapes and their size and their similarity.

As students get done with the Smiley Face Task an extension activity will be assigned. The activity will be to perform an enlargement and a reduction to reinforce the characteristic of the scale factor (larger than 1, enlargement, less than 1, reduction and equal to 1, congruent). Also, to practice dilating a figure by reinforcing the coordinate rule $(x, y) \rightarrow (dx, dy)$.

Differentiated Instruction:

- *Students are grouped heterogeneously based on data from 10/11 quiz. This type of grouping will allow for students to have the level of conversation based on understanding of the previous transformations.*
- *Students will be given work period with "hint bubbles" to help lead them through the activity.*

Questions I want to make sure I ask:

- How are the coordinates comparing? (DOK2)

- What do you notice about the way they look? (DOK2)
- Is that figure "similar" to figure 1? (DOK2)
- What is different about the shape compared to figure 1? (DOK2)
- What do you think makes a true dilation? (DOK3)
- Are the figures truly dilated if they are only "stretched" in one direction? (DOK3)
- What if they were "stretched" in both directions, but by a different number? (DOK3)
- What if the shape is smaller than the original shape, is it a dilation? (DOK2)
- Describe how to determine if shapes are similar. (DOK2)

Closing:

Describe how you will facilitate the closing.

6 groups will transfer one of the graphs to a larger grid (just like the originals) so the class can have a discussion while looking and comparing the figures.

Discussion of the students' findings (continue to review the questions from the activity) – teacher led to be sure to get the underlying information out about the importance of the task.

Data Discussion/Assessment:

Informal: Observation and discussion
Formative: Quiz on all Transformations 10/16
Summative: Unit Summative planned for 10/25
Data Discussion: Will occur after quiz on 10/16

Differentiation:

- Flexible Grouping: Students are paired heterogeneously determined by 10/11 quiz data. Students who have had a stronger grasp of concepts will be able to reinforce their understanding by having conversations with students who have a similar understanding of the unit. The grouping also allows for Teacher to ask leading questions that remediate and enrich based on student needs.
- Students will be given copies of the faces they did not have time to graph so they can get into the discussion in a timely manner.

McClure Middle School Lesson Plans:

Teacher: Poole **Topic:** Transformations - Dilations **Day:** 14

Unit: Transformations - Dilations	**Grade/Subject:** 8th Math
Standard/Element: **MGSE8.G.1** Verify experimentally the properties of rotations, reflections, and translations: Lines are taken to lines and line segments to line segments of the same length; angles are taken to angles of the same measure; parallel lines are taken to parallel lines. **MGSE8.G.2** Understand that two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. **MGSE8.G.3** Describe the effect of dilations, translations, rotations, and reflections on 2-dimensional figures using coordinates.	**EQ:** When are triangles similar? How can you tell that triangles are similar? What happens to the size and shape of a figure when it is transformed by a translation, reflection or rotation? How can I tell what transformation was applied to a shape?

Opening

Launch/Anchor Concepts:

Review Dilation coordinate Rule: (x, y) → (dx, dy)

Explain what would happen to your shape if you transformed it using each of the given rules with the center of dilation at the origin.

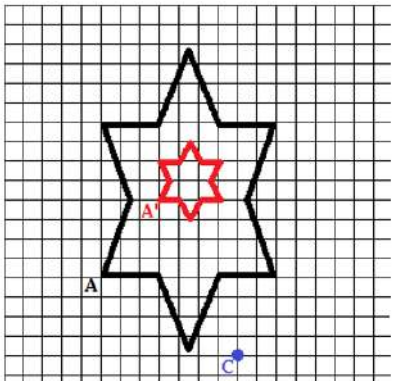
a. $(4x, 4y)$
b. $(0.25x, 0.25y)$
c. $(2x, y)$
d. $(3x, 3y + 5)$
e. $(x + 5, y - 5)$
f. $(\frac{1}{2}x - 1, \frac{1}{2}y)$
g. $(x + 4, -y)$

g. Will any of the transformed figures be similar to the original figure? Explain.

h. If you make a new figure by adding 2 units to the length of each side of your shape, will the two figures be similar? Why or why not?

What if given 2 similar shapes, how can you figure what scale factor they have been dilated?

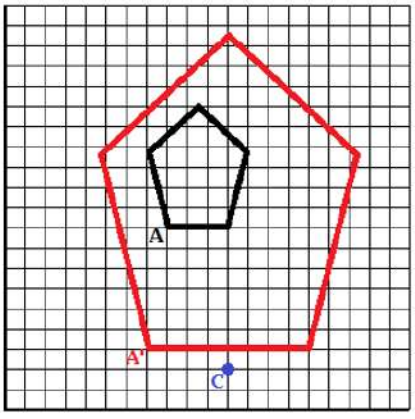
Scale factor = $\frac{image\_length}{preimage\_length}$ = _____



$$Scale\ Factor = \frac{image\ length}{pre\ image\ length}$$

Write the dilation coordinate rule for each figure.

Scale factor = $\frac{image\_length}{preimage\_length}$ = _____



Work Period

Practice /task/activity:

Students will practice using scale factor to dilate a figure and finding scale factor when 2 similar figures are given.

Differentiated Instruction:

- *Students are grouped heterogeneously based on data from 10/11 quiz. This type of grouping will allow for students to have the level of conversation based on understanding of the previous transformations.*
- *Students will be given work period with "hint bubbles" to help lead them through the activity.*
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Questions I want to make sure I ask:

- How are the coordinates comparing? (DOK2)
- What do you notice about the way they look? (DOK2)
- Is the new figure "similar" to new image? (DOK2)
- What is different about the shape compared to the preimage? (DOK2)
- What do you think makes a true dilation? (DOK3)
- Are the figures truly dilated if they are only "stretched" in one direction? (DOK3)
- What if they were "stretched" in both directions, but by a different number? (DOK3)
- What if the shape is smaller than the original shape, is it a dilation? (DOK2)
- Describe how to determine if shapes are similar. (DOK2)

Closing:

Describe how you will facilitate the closing.

Students will be chosen to show a problem under the camera that the class was struggling with to explain how they showed the dilation.

Data Discussion/Assessment:

Informal: Observation and discussion
Formative: Quiz on all Transformations 10/16
Summative: Unit Summative planned for 10/25
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Differentiation:

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